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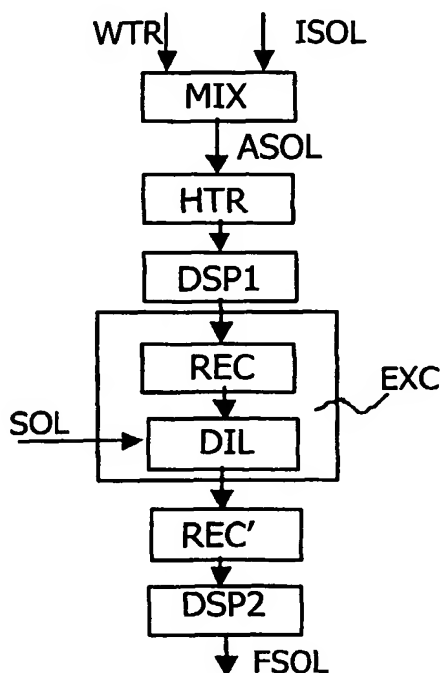
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(54) Title: PROCESS TO PRODUCE SOLUTIONS TO BE USED AS COATING IN PHOTO-CATALYTIC AND TRANSPAR-
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(57) Abstract: The invention relates to a process for producing a stable solution containing Anatase titanium oxide intended to be deposited on a substrate in order to obtain a transparent photo-catalytic coating. Such a process includes the preparation of an initial stabilized peptized solution including a titanium precursor material, an organic solvent, an acid agent, the mixing of said initial solution with a large amount of water, the pH of the obtained intermediate solution being less than 3, subjecting said intermediate solution and its dispersion to a heat-treatment, the exchange of water by an organic solvent with low surface tension to obtain a final solution that is finally dispersed. The invention particularly allows to coat thermally sensitive and/or transparent substrates with photo-catalytic films of high optical quality.

WO 2004/028973 A1



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C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP 1 167 296 A (KAWASAKI HEAVY IND LTD) 2 January 2002 (2002-01-02) cited in the application	14-16
Y	paragraph '0082! - paragraph '0088! paragraph '0111! - paragraph '0113! claims 1-7	1-13
Y	--- DATABASE WPI Section Ch, Week 200230 Derwent Publications Ltd., London, GB; Class D15, AN 2002-251861 XP002271677 & KR 2001 096 668 A (E & B KOREA), 8 November 2001 (2001-11-08) abstract --- -/--	1-13

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C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

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P,A	US 6 576 589 B1 (CHOY JIN HO ET AL) 10 June 2003 (2003-06-10) claims 1-7; example 1	
A	& KR 2001 028 286 A 6 April 2001 (2001-04-06)	1-16
A	--- PATENT ABSTRACTS OF JAPAN vol. 2002, no. 11, 6 November 2002 (2002-11-06) & JP 2002 211928 A (ALTRA:KK), 31 July 2002 (2002-07-31) abstract	1-16
A	--- KARN R K ET AL: "On the synthesis of nanostructured TiO ₂ anatase phase and the development of the photoelectrochemical solar cell" INTERNATIONAL JOURNAL OF HYDROGEN ENERGY, ELSEVIER SCIENCE PUBLISHERS B.V., BARKING, GB, vol. 24, no. 1, January 1999 (1999-01), pages 27-35, XP004158829 ISSN: 0360-3199 the whole document	1-16
P,A	--- EP 1 316 532 A (KONINKL PHILIPS ELECTRONICS NV) 4 June 2003 (2003-06-04) page 3, column 3, line 47 - line 55	1-16
A	--- EP 1 146 099 A (JSR CORP) 17 October 2001 (2001-10-17) table 1 -----	1-16

INTERNATIONAL SEARCH REPORT

Interf. Application No
PC 03/04141

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
EP 1167296	A	02-01-2002	JP 3122082 B2 JP 2000225339 A JP 3055684 B2 JP 2000233928 A EP 1167296 A1 WO 0046153 A1	09-01-2001 15-08-2000 26-06-2000 29-08-2000 02-01-2002 10-08-2000
KR 2001096668	A	08-11-2001	NONE	
US 6576589	B1	10-06-2003	KR 2001028286 A JP 2001104797 A	06-04-2001 17-04-2001
JP 2002211928	A	31-07-2002	NONE	
EP 1316532	A	04-06-2003	FR 2832999 A1 EP 1316532 A1	06-06-2003 04-06-2003
EP 1146099	A	17-10-2001	EP 1146099 A2 JP 2001354902 A US 2002007006 A1 JP 2002003785 A	17-10-2001 25-12-2001 17-01-2002 09-01-2002